



City of Painesville, Ohio Vanadium Redox Battery Demonstration Program

Project Description

The City of Painesville, Ohio and its partners will demonstrate vanadium redox battery storage capacity at the 32 mega-watt, coal-fired Painesville Municipal Electric Plant (PMEP). Using stored power enables the facility to obtain the same daily output requirement in a more efficient manner with a lower carbon footprint. When fully implemented the plant will operate at a constant 26 MW, 80 percent of rated capacity. The long-term goal is to scale the battery system in stages, finally upgrading the facility to 10 MW with up to 80 megawatt hours of storage. 1 MW of power with 6 to 8 hours of storage will be installed in the first phase. This capacity is sufficient for Painesville to evaluate the benefits of energy storage and how it can be used to optimize power generation efficiency as well as facilitating American Municipal Power's ability to level the peak demands of the system. A bi-directional four quadrant inverter with a rated capacity of 1.0MW and 1,440 amps at 480 VAC will be used to provide AC/DC and voltage conversions. The battery will be constructed with two parallel electrolyte flow systems providing the total net electrical capacity of 1.0 MW. Each subsystem will be comprised of 64, 10kW stacks. The subsystems will be arranged in parallel to supply peak operating loads. Each stack subsystem will have their electrolyte flow into two 15,000 gallon polymer tanks at rates ranging between 500 and 1500 gallons per minute. The battery components will be produced in the United States, and the stacks will be assembled in Painesville and then installed at the PMEP Battery Building.

Goals/Objectives

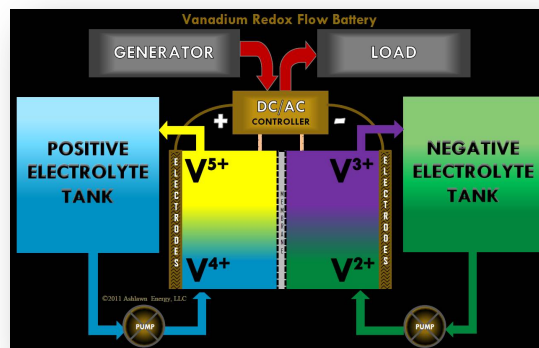
- Demonstrate power storage to provide spinning reserves in a grid environment with expansion to a larger scale
- Establish a template that can be introduced throughout the United States
- Provide data of the active use of storage to manage peak requirements in the most efficient manner

Key Milestones

- Battery Building Construction Complete (June 2012)
- Begin production of demonstration battery system (July 2013)
- Battery commissioning (March 2014)
- Demonstration Period Completed (November 2015)

Benefits

- 29 jobs created with an additional 212 created by 2016
- Energy costs reduced
- Power quality improved
- Carbon emissions reduced by 24,000 metric tons



CONTACTS

Ronald Staubly
Project Manager
National Energy Technology Laboratory
3610 Collins Ferry Road
Morgantown, WV 26507-0880
304-285-4828
Ronald.Staubly@netl.doe.gov

Jeff McHugh
Principal Investigator
City of Painesville
7 Richmond Street
Painesville, OH 44077-3222
440-392-5954
jmchugh@painesville.com

PARTNERS

Painesville Municipal Power
Ashlawn Energy LLC
Concurrent Technologies Corporation
GPD Group Inc

PROJECT DURATION

03/1/2010–10/28/2015

BUDGET

Total Project Value
\$9,462,623

DOE/Non-DOE Share
\$4,243,570/\$5,219,053

EQUIPMENT

Power Conversion System
Battery Control System
Redox Battery Stacks
Storage Tanks
Electrolyte Circulation System

DEMONSTRATION STATES

Ohio

CID: OE0000233

Managed by the National Energy Technology Laboratory for the Office of Electricity Delivery and Energy Reliability